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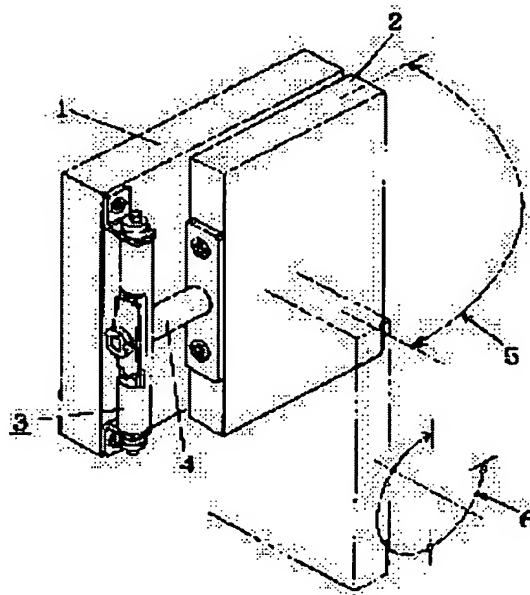
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(54) HINGE DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a hinge device reduced in entire size by simplifying the shapes of parts or reducing the number of part items to further simplify the workability of machining and assembly.

SOLUTION: This two-axis hinge device comprising a openable shaft 7 fitted to a body and a rotating shaft 11 perpendicular to the openable shaft 7 comprises a rotating stopper plate 16 fittedly locked to a plane part 8 provided on the openable shaft 7, a small pin 14 buried in the rotating shaft 11 in correspondence with a locking claw 18, a rectangular click spring 20 locked to the rotating stopper plate 16 and allowing the rotating shaft 11 to pass therethrough, and a rotating click plate crimpingly press-fitted into the tip 15 of the rotating shaft and formed integrally with the rotating shaft. The hinge device may be such that the rotating click spring is locked directly to the plane part of the rotating shaft, and a rotation limiting locking claw is installed on the inner periphery of the hole of the spring for passing the rotating shaft therethrough.



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CLAIMS

[Claim(s)]

[Claim 1] In the biaxial hinge of the rectangular penetration mold which has a mounting beam closing motion shaft and the revolving shaft inserted at the prepared hole which carried out rectangular penetration at this closing motion shaft on a body The small pin currently laid under the revolving shaft so that it may correspond to the stop pawl of the revolution stopper plate which a fitting stop is carried out and is inserted in the revolving shaft at the flat-surface section prepared in the closing motion shaft, and a revolution stopper plate, Hinge equipment which consists of a revolution click plate which is carrying out press fit caulking **** unification at the head of a revolving shaft which projects from the revolution click spring of the shape of a strip of paper which it is stopped by this revolution stopper plate and a revolving shaft penetrates, and this revolution click spring.

[Claim 2] In the biaxial hinge of the rectangular penetration mold which has a mounting beam closing motion shaft and the revolving shaft inserted at the prepared hole which carried out rectangular penetration at this closing motion shaft on a body a click spring is directly stopped in the flat-surface section prepared in the closing motion shaft — making — the hole for revolving-shaft penetration of this click spring — to inner circumference Hinge equipment which consists of a click plate which is carrying out press fit caulking **** unification at the head of a revolving shaft which forms the stop pawl of revolution regulation corresponding to the small pin currently laid under the revolving shaft, and projects from a click spring.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the hinge equipment which makes the closing motion shaft which can rotate especially lids, such as a display, in the rectangular direction first after opening further, an aperture and, and a revolving shaft come to intersect perpendicularly about the biaxial hinge equipment which connects the lid of the display of electronic equipment etc. with the body side of a case.

[0002]

[Description of the Prior Art] With conventional hinge equipment, it has the closing motion shaft which was grasped free [closing motion] by the body of electronic equipment, and was ****(ed), and the revolving shaft ****(ed) by penetrating the closing motion shaft, and generation and revolution regulation of a feeling of a revolution click were formed in preparation for the device fixed to the revolving shaft.

[0003] If it states in more detail using drawing 14 , the bushing 52 of the elastic body with which the body of electronic equipment (graphic display abbreviation) was equipped will be made to grasp the closing motion shaft 51 free [a revolution] on both sides of a shaft, the flat-surface section 53 fabricated in the shape of a half moon will be formed in the center section of this shaft 51, a hole 54 will be dug in the center of the flat-surface section, and penetration insertion of the revolving shaft 55 will be carried out. The stop section 56 which enlarged the diameter a little in the suitable location of a revolving shaft 55 is formed, and the die length inserted in a hole 54 is regulated, then the abbreviation gold coin-like press fit cost 57 is formed in a part for the point.

[0004] It escapes from the flat-surface section 53 of the closing motion shaft 51, it comes out, and the head of the revolving shaft 55 inserted by penetrating a hole 54 stops by the stop section 56. Then, to a part for the point, sequential insertion of the revolution stopper plate 58, the swivel clip spring 59, and the revolution click plate 60 is carried out, and it goes. In the flat-surface section 53 of the closing motion shaft 51, the revolution stopper plate 58 carries out a press fit stop, and is fixed.

[0005] The press fit unification of the stop pawl 61 of a revolution click spring is carried out at the infixed 62 of a revolution click plate, fitting press fit is carried out at the press fit cost 57 at the head of a revolving shaft, caulking fixing of the revolution click plate is carried out with a revolving shaft, therefore a revolving shaft 55 grasps with the stop section 56 and the revolution click plate 60, and a revolving shaft 55 is ****(ed) free [a revolution] to the closing motion shaft 51 in this way. The back end of a revolving shaft 55 is equipped with 63, such as a display lid shown by the dotted line.

[0006] If this display lid etc. makes 63 open and close in the arrow-head 64 direction and is further rotated in the direction of an arrow head 65 The regulation pawl 66 which rotated by the revolution click plate 60 fixed to the revolving shaft 55 having been united, and was formed in this plate with the regulation stopper 67 of a revolution stopper plate + Carry out the operation which generates the some feeling [as opposed to / whenever it receives regulation in / revolution / 90 degrees - 180 degrees, and the small height 68 further prepared in the 59th

page of a revolution click spring caves in to the stoma 69 dug by the revolution stopper plate 58, then it runs aground / a revolution] of resistance of a click, i.e., a feeling.

[0007]

[Problem(s) to be Solved by the Invention] However, by the approach of uniting the revolution click plate 60 and the revolution click spring 59 with such a revolving shaft, taking out the regulation pawl 66 outside and forming it in a revolution click plate, the periphery radius of gyration of this pawl becomes large, and a limitation is to miniaturize the whole hinge equipment.

[0008] Furthermore, processing becoming difficult and assembling one point at a time using the miniaturized each part article, although it is made small in case each component part is processed therefore had also produced the fault to which assembly difficulty is made to increase more.

[0009] So, in this invention, these faults are canceled, and the configuration of each part article is simplified, or components mark are reduced, and it aims at carrying out the plain simplification of the workability of processing and assembly more, and enabling the further whole miniaturization.

[0010]

[Means for Solving the Problem] In the biaxial hinge of the rectangular penetration mold which has the revolving shaft inserted in the hole which carried out rectangular penetration of the invention of claim 1 on the mounting beam closing motion shaft and this closing motion shaft at the body, and was prepared The small pin currently laid under the revolving shaft so that it may correspond to the stop pawl of the revolution stopper plate which a fitting stop is carried out and is inserted in the revolving shaft at the flat-surface section prepared in the closing motion shaft, and a revolution stopper plate; It is hinge equipment which consists of a revolution click plate which is carrying out press fit caulking **** unification at the head of a revolving shaft which projects from the revolution click spring of the shape of a strip of paper which it is stopped by this revolution stopper plate and a revolving shaft penetrates, and this revolution click spring.

[0011] it is with the regulation stopper which it was made to project inside the radius of gyration of the small pin projected and prepared in the revolving shaft, and the small pin prepared in the stopper plate, and prepared, and a revolving shaft is boiled as usual, revolution regulation is carried out, the small height prepared in the click spring fits into the notch of a click plate, and this invention generates a feeling of a click for every predetermined include angle.

[0012] In the biaxial hinge of the rectangular penetration mold which has the revolving shaft inserted in the hole which carried out rectangular penetration of the invention of claim 2 on the mounting beam closing motion shaft and this closing motion shaft at the body, and was prepared a click spring is directly stopped in the flat-surface section prepared in the closing motion shaft — making — the hole for revolving-shaft penetration of this click spring — to inner circumference It is hinge equipment which consists of a click plate which is carrying out press fit caulking **** unification at the head of a revolving shaft which forms the stop pawl of revolution regulation corresponding to the small pin currently laid under the revolving shaft, and projects from a click spring.

[0013] The small pin projected and prepared in the revolving shaft contacts the stop pawl of a click spring, and this invention carries out the operation which regulates a revolution of a revolving shaft to a predetermined revolution limitation.

[0014]

[Embodiment of the Invention] A drawing is used for below and an example is explained to it. Drawing 1 is the perspective view having shown the whole abbreviation for the object equipped with this invention. To the body 1 of electronic equipment, the closing motion section 3 of this invention concludes, and is being fixed, and conclusion immobilization of 2, such as a lid with which the display etc. is contained, is carried out by the back end of the revolution section 4.

[0015] A body 1 is used as a hand and it first has [field / the] further structure which the revolution to +90 degrees - -180 degrees or -90 degrees - +180 degrees of the reverse can do in the arrow-head 6 direction in 2, such as lids which could open and close 2 free in the direction of an arrow head 5, and were opened, such as a lid. A feeling of a click occurs every [90

degrees or] 180 degrees in that case, and a lid etc. does not carry out overspeed r.p.m. for 2 to 270 degrees or more on the whole.

[0016] In addition, since the closing motion section 4 which mainly consists of a closing motion shaft in this invention may use an approach as usual and structure as it is, it does not explain special about that approach or operation.

[0017] The revolution section 3 of the hinge equipment which becomes this invention is explained according to the outline exploded view of drawing 2. The flat-surface section 8 which it comes to fabricate in the shape of a half moon on the closing motion shaft 7 is formed. A boss 9 is dug at least in the center section of the flat-surface section 8. The base 10 shallow to boss 9 perimeter is also established in the background of the flat-surface section 8. The amount of [of a revolving shaft 11] point attaches the level difference side 12, and it has made it thin, is the suitable location of the shank 13 with a thin head, and has carried out the press fit equipment of the small pin 14. Although it is shown in its native country where a revolving shaft 11 is already driven in and equipped with the small pin 14, this pin is inserted in a boss 9 and carries out wearing immobilization behind. an axis end 15 — like a graphic display — the shape of a gold coin — shaping — carrying out — caulking fixing and welding fixing — facilities — it is made like.

[0018] The revolution stopper plate 16 is fabricated with a little thicker plate in the shape of a strip of paper, has the blanking hole 17 of a larger bore than the radius of gyration of the small pin 14 in the center, sends the revolution regulation pawl 18 to these some blanking holes 17, and has prepared it in it. And a notch 19 is fabricated on both sides of the longitudinal direction. Then, fitting press fit is carried out and this revolution stopper plate 16 is fixed to the flat-surface section 8 of the closing motion shaft 7.

[0019] the revolution click spring 20 also consists of elastic plates which carried out the shape of a strip of paper like a graphic display — having — the blanking hole 21 which can penetrate a shank 13 in the center — having — the suitable location of a longitudinal direction — the small projection 22 — one piece — or two or more pieces are prepared and the stop pawl 23 of a graphic display configuration is further formed in the ends of a longitudinal direction. The stop pawl 23 can fit into the notch 19 of the revolution stopper plate 16. It consists of plates a little also with the thicker revolution click plate 24.

[0020] The gold coin hole 25 is dug in the center of this revolution click plate 24, and the notch 26 is fabricated to the periphery position of symmetry. The notch 26 must correspond with the small projection 22 of the revolution click spring 20.

[0021] Next, in order to assemble the revolution section 4 using these components Press fit equipment is carried out at the hole which a boss 9 is made to penetrate a revolving shaft 11, and has dug the small pin 14 beforehand to the revolving shaft 11 first the back. the flat-surface section of the closing motion shaft 7 is made to carry out the fitting equipment of the revolution stopper plate 16 after that, a revolution click spring is inserted in a revolving shaft, and fitting is carried out to the notch 19 of the revolution stopper plate 16 — making — the last — the revolution click plate 24 — the axis end 15 of a revolving shaft 11 — pressing fit — a revolving shaft 11 and caulking — and welding fixing is carried out.

[0022] The condition after assembly is shown in drawing 3. Revolving-shaft 11 the very thing is ****(ed) free [a revolution] by the boss 9 which holds the condition of having grasped the closing motion shaft 7 with the level difference side 12 and revolution click plate 24 at a head, and presses each other firmly on both sides of a closing motion shaft according to the elastic reaction force which the revolution click spring 20 generates, and is inserted on skid stop conditions. The small pin 14 is located in the plate of the revolution stopper plate 16, and the small pin 14 changes the include angle within the blanking hole 17.

[0023] The condition of having deleted and seen the revolution click spring 20 by view X-X of drawing 3 is used as a front view, and is shown in drawing 4. The condition that the small pin 14 is in the lower right as shown in drawing is a location immediately after [, such as a lid,] opening 2. The stop pawl 23 of the revolution click spring 20 advances into the notch 19 of the revolution stopper plate 22, and restrains an optional revolution of this revolution click spring 20.

[0024] Next, the operation is explained according to drawing 5 — drawing 7. Drawing 5 shows the

condition immediately after opening 2, such as a lid, in the direction of the condition which has closed 2 or arrow heads 5, such as a lid shown in drawing 1. The small pin 14 has come out in the direction of the graphic display lower right.

[0025] Drawing 6 shows the condition after [, such as a lid,] rotating 2. The axis end 15 of revolving shafts currently fixed to 2, such as a lid, also rotates in the arrow-head 27 direction, namely, rotates this counter clockwise direction at forward (+), then +90 degrees, and regulates the overspeed r.p.m. beyond it there in contact with the stop pawl 18 with which the small pin 14 is formed in the revolution stopper plate 16.

[0026] Drawing 7 shows the condition after [, such as a lid,] rotating 2 in the arrow-head 28 direction of reverse. The small pin 14 carries out -180-degree revolution clockwise, and is stopped in contact with the left-hand side of the opposite hand of the stop pawl 18. Therefore, the small pin 14 prepared in the axis end 15 can be rotated free in the range of 270 degrees in all of right reverse. + In order to make it the pivotable range of 180 degrees - -90 degrees, this small pin 14 is turned to the upper left direction of a drawing, and take it out, form the stop pawl 18 in the method location of the lowest, or it is easy to come out. This condition is determined according to a product concept.

[0027] Next, a generating operation of a feeling of a click is explained. If the notch 26 of the small projection 22 prepared on the revolution click spring 20 whenever the revolution click plate 24 by which caulking immobilization was carried out was rotated by the axis end 15 of a revolving shaft 11 at +90 degrees or -180 degrees, as shown in drawing 2, and a revolution click plate agrees, in response to the reaction force of the revolution click spring 20, it will fit each other into each other.

[0028] Therefore, in order to slip out of the condition of fitting in each other, a revolution is made to generate some revolution resistance forces at the flash which the edge of a notch 26 runs aground to the small projection 22, namely, begun to turn a revolving shaft 11. If a notch 26 results in the reverse in the near location of the small projection 22, a revolution will become light suddenly and it will stop in an orientation at accuracy. In this way, if a display lid etc. rotates 2, by graphic display, a feeling of a click will be generated in the location of +90 degrees and -180 degrees in an orientation.

[0029] Although a notch 26 counters and being prepared in two places in drawing 2, if four of these are prepared in a suitable location by **, such as 90 etc. degrees, a feeling of a click will occur every 90 degrees with a natural thing.

[0030] The hinge equipment which furthermore becomes invention of claim 2 is explained according to the decomposition perspective view of drawing 8. The flat-surface section 32 which it comes to fabricate in the shape of a half moon on the closing motion shaft 31 is formed, and the stop slot 33 is established in two termination of the flat-surface section. A boss 34 is dug at least in the center section of the flat-surface section 32, and the shallow base 35 is also established in the background around the boss 34.

[0031] The amount of [of a revolving shaft 36] point attaches the level difference side 37, and it makes it thin, forms a shank 38 and carries out press fit wearing of the small pin 39 in the suitable location of the shank 38.

[0032] Although the small pin 39 is driven into a shank 38 before assembly even in this Fig. and it is shown in the condition, finishing [wearing], it is as above-mentioned that it is what inserts this pin in a boss 34 and carries out wearing immobilization behind. an axis end 40 — a graphic display — like — the shape of a gold coin — shaping — carrying out — caulking fixing and welding fixing — facilities — it is made like.

[0033] Although it consists of elastic plates with which the revolution click spring 41 also carried out the shape of a strip of paper like a graphic display, it has the blanking hole 42 which can penetrate a shank 13 in the center, and fabricates inside the blanking hole 42 by bending the stop pawl 43 to the flat-surface section 32 side (drawing other side).

[0034] moreover — the suitable location of a longitudinal direction — the small heights 44 — one piece — or two or more pieces are prepared and the fitting pawl 45 of a graphic display configuration is further formed in the ends of a longitudinal direction.

[0035] The revolution click plate 46 consists of thicker plates a little. The configuration which

digs the gold coin hole 47 in the center of this revolution click plate 46, and fabricates the notch 48 to the periphery position of symmetry is the same as the above-mentioned example. This notch 48 must correspond with the small heights 44 of the revolution click spring 41.

[0036] Next, carry out press fit wearing at the hole which a boss 34 is made to penetrate a revolving shaft 36 in order to assemble using these components, and has dug the after and small pin 39 beforehand to the revolving shaft 36 first, insert the revolution click spring 41 in a revolving shaft 36 after that, the stop slot 33 of a closing motion shaft is made to carry out fitting of the fitting pawl 45, finally the revolution click plate 46 is pressed fit in the axis end 40 of a revolving shaft, and revolving-shaft, caulking, and welding fixing is carried out.

[0037] A side elevation shows the condition of the built up section of this example to drawing 9. Revolving-shaft 36 the very thing is *****(ed) free [a revolution] by the boss 34 which holds the condition of having grasped the closing motion shaft 31 with the level difference side 37 and revolution click plate 46 at a head, and presses each other firmly on both sides of this according to the elastic reaction force which the revolution click spring 41 generates, and is inserted on skid stop conditions. The small pin 39 is located in the gap of the revolution click spring 41 and the flat-surface section 32, and the small pin 39 changes angle of rotation smoothly in the gap.

[0038] By view Y-Y of drawing 9, the condition of having seen the revolution click spring 41 from the table is used as a front view, and is shown in drawing 10. The condition that the small pin 39 is in the lower right as shown in drawing is a location immediately after [, such as a lid,] opening 2. The fitting pawl 45 of the revolution click spring 41 fits into the stop slot 33 of a closing motion shaft, and restrains migration and a revolution of the arbitration of this revolution click spring 41.

[0039] Next, the operation is explained according to drawing 11 - drawing 13. However, since the operation resembles the previous example, duplication is avoided and it explains simply.

[0040] Drawing 11 is in the condition which shows the condition immediately after opening 2, such as a lid, in the direction of the condition which has closed 2 or arrow heads 5, such as a lid shown in drawing 1, and is equivalent to drawing 5 in a previous example. The small pin 39 is suitable in the direction of the lower right of drawing with the natural thing.

[0041] Drawing 12 shows the condition after [, such as a lid,] making the counterclockwise rotation of the direction of forward (+) rotate 2 [90-degree]. The small pin 39 of one also contacts the stop pawl 43 which rotated in the arrow-head 49 direction and was formed for the revolution click spring 41 2, such as a lid, and the overspeed r.p.m. beyond it is regulated.

[0042] Drawing 13 shows the condition after rotating reverse in the arrow-head 50 direction. - 180 degrees of small pins 14 rotate clockwise, and after they contact the stop pawl 43, they stop. Therefore, as for 2, the lid of a revolution etc. becomes free in the range of 270 degrees of convenience possible. Since it is the same as a before example about a generating operation of a feeling of a click, explanation is omitted here.

[0043] Although a notch 48 counters and being prepared in two places in drawing 8, it is possible for a feeling of a click to also make it generate every 90 degrees in **, such as 90 etc. degrees, with a natural thing.

[0044]

[Effect of the Invention] As explained in full detail above, according to invention of claim 1, the configuration of each part article is simplified, and the mark of components are reduced, common simplification simplification is carried out more and the workability of processing by it and assembly can be miniaturized in the whole. Invention of claim 2 can reduce components mark further.

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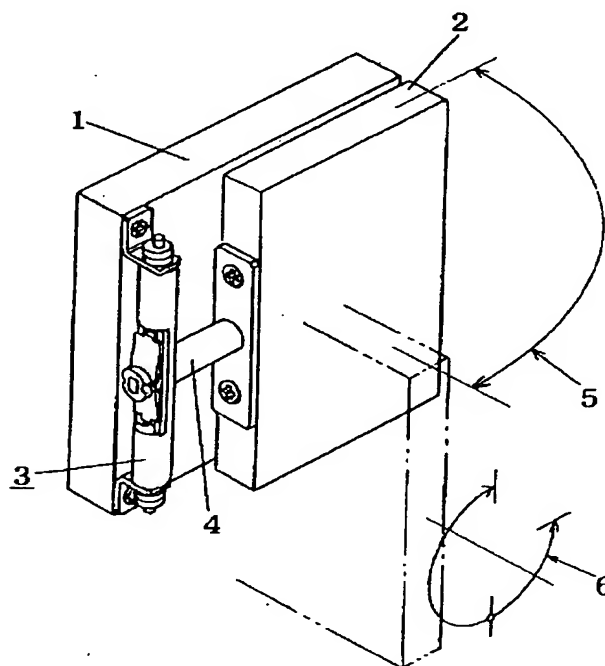
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(54) 【発明の名称】 ヒンジ装置

(57) 【要約】

【課題】 各部品の形状を単純化し、あるいは部品点数を削減して、加工および組立の作業性をより平易単純化して全体のさらなる小型化を可能にするヒンジ装置を提供する。

【解決手段】 本体に取付けた開閉軸７と、それと直交する回転軸１１とを有する２軸ヒンジにおいて、開閉軸７に設けてある平面部８に嵌合係止されている回転ストッパー板１６と、その係止爪１８に対応するように回転軸１１に埋設してある小ピン１４と、該回転ストッパー板１６に係止されていて回転軸１１が貫通する短冊状のクリックばね２０と、回転軸先端１５に圧入カシメられて一体化している回転クリック板とからなるヒンジ装置である。又、回転クリックばねを回転軸の平面部に直接係止させ、該ばねの回転軸貫通用の孔内周に回転規制の係止爪を設けたものでもよい。



【特許請求の範囲】

【請求項1】 本体に取付けた開閉軸と、該開閉軸に直交貫通して設けた孔に挿入されている回転軸とを有する直交貫通型の2軸ヒンジにおいて、開閉軸に設けてある平面部に嵌合係止されて回転軸に挿入されている回転ストッパー板と回転ストッパー板の係止爪に対応するように回転軸に埋設してある小ピンと、該回転ストッパー板に係止されていて回転軸が貫通する短冊状の回転クリックばねと、該回転クリックばねより突出する回転軸先端に圧入カシメられて一体化している回転クリック板とからなるヒンジ装置。

【請求項2】 本体に取付けた開閉軸と、該開閉軸に直交貫通して設けた孔に挿入されている回転軸とを有する直交貫通型の2軸ヒンジにおいて、開閉軸に設けてある平面部にクリックばねを直接係止させ、該クリックばねの回転軸貫通用の孔内周に、回転軸に埋設してある小ピンに対応して回転規制の係止爪を設け、クリックばねより突出する回転軸先端に圧入カシメられて一体化しているクリック板とからなるヒンジ装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、電子機器の表示部の蓋等を筐体の本体側に連結する2軸ヒンジ装置に関し、特に表示部等の蓋をまず開き、更に開いた後で直交方向に回転させることができる、開閉軸と回転軸とを直交させてなるヒンジ装置に関する。

【0002】

【従来の技術】従来のヒンジ装置では、電子機器本体に開閉自在に把持され軸持された開閉軸と、その開閉軸を貫通して軸持された回転軸とを有し、回転クリック感の生成と回転規制とは回転軸に固定した機構に備えて形成されていた。

【0003】図14を用いてさらに詳しく述べるならば、電子機器本体（図示省略）に装着した弾性体の軸受筒52に開閉軸51を軸の両側で回転自在に把持させ、該軸51の中央部位には半月状に成形した平面部53を設けて、その平面部の中央に孔54を穿って回転軸55を貫通挿入する。回転軸55の適切な位置で直径を若干大きくした係止部56を設けて、孔54に挿入される長さを規制しておき、そうしてその先端部分には略小判状の圧入代57を設ける。

【0004】孔54を貫通して挿入されてきた回転軸55の先端は、開閉軸51の平面部53を抜け出て係止部56により止まる。そうしてその先端部分に対して回転ストッパー板58、回転クリックばね59及び回転クリック板60を順次挿入して行く。回転ストッパー板58は開閉軸51の平面部53内に圧入係止して固定される。

【0005】回転クリックばねの係止爪61は、回転クリック板の切込み62に圧入一体化され、その回転クリ

ック板は回転軸先端の圧入代57に嵌合圧入されて回転軸とカシメ固着され、したがって回転軸55は係止部56と回転クリック板60とで把持し、かくして回転軸55は開閉軸51に対して回転自在に軸持される。回転軸55の後端に点線で示した表示部蓋等63が装着される。

【0006】該表示部蓋等63を矢印64方向に開閉させ、かつさらに矢印65の方向に回転させると、回転軸55に固定された回転クリック板60も一体となって回転をし、該板に設けられた規制爪66が回転ストッパー板の規制ストッパー67によって、 $+90^{\circ} \sim -180^{\circ}$ の回転範囲で規制を受け、さらには回転クリックばね59面に設けてある小突起部68が、回転ストッパー板58に穿たれた小孔69に陥没し、そうして乗り上げる度に回転に対する若干の抵抗感、即ちクリック感を発生する作用をする。

【0007】

【発明が解決しようとする課題】しかし、このような回転軸に回転クリック板60と回転クリックばね59とを一体化し、回転クリック板に規制爪66を外側に出して設ける、という方法では、該爪の外周回転半径が大きくなり、ヒンジ装置全体を小型化することに限界がある。

【0008】さらには、各構成部品を加工する際に小さくするが故に加工が難しくなり、かつ小型化された各部品を一点ずつ使って組立てることは、より組立難度を増加させる欠点も生じていた。

【0009】そこで、この発明では、これらの欠点を解消して各部品の形状を単純化し、あるいは部品点数を削減し、加工及び組立の作業性をより平易単純化して全体のさらなる小型化を可能にすることを目的とする。

【0010】

【課題を解決するための手段】請求項1の発明は、本体に取付けた開閉軸と、該開閉軸に直交貫通して設けた孔に挿入されている回転軸とを有する直交貫通型の2軸ヒンジにおいて、開閉軸に設けてある平面部に嵌合係止されて回転軸に挿入されている回転ストッパー板と回転ストッパー板の係止爪に対応するように回転軸に埋設してある小ピンと、該回転ストッパー板に係止されていて回転軸が貫通する短冊状の回転クリックばねと、該回転クリックばねより突出する回転軸先端に圧入カシメられて一体化している回転クリック板とからなるヒンジ装置である。

【0011】この発明は、回転軸に突出して設けてある小ピンと、ストッパー板に設けてある小ピンの回転半径の内側に突出させて設けた規制ストッパーとで、回転軸を従来通りに回転規制をし、クリックばねに設けてある小突起部がクリック板の切欠き部に嵌合して、所定の角度毎にクリック感を発生させる。

【0012】請求項2の発明は、本体に取付けた開閉軸と、該開閉軸に直交貫通して設けた孔に挿入されている

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回転軸とを有する直交貫通型の2軸ヒンジにおいて、開閉軸に設けてある平面部にクリックばねを直接係止させ、該クリックばねの回転軸貫通用の孔内周に、回転軸に埋設してある小ピンに対応して回転規制の係止爪を設け、クリックばねより突出する回転軸先端に圧入カシメられて一体化しているクリック板とからなるヒンジ装置である。

【0013】この発明は、回転軸に突出して設けてある小ピンがクリックばねの係止爪に当接し、所定の回転限界で回転軸の回転を規制する作用をする。

【0014】

【発明の実施の形態】以下に図面を用いて実施例の説明をする。図1はこの発明を装着する対象の略全体を示した斜視図である。電子機器類の本体1に対して、この発明の開閉部3が締結して固定されており、表示部等が収納されている蓋等2は回転部4の後端で締結固定されている。

【0015】本体1を手にして先ず蓋等2を矢印5の方向に自在に開閉でき、開いた蓋等2をさらにその面を矢印6方向に $+90^{\circ} \sim -180^{\circ}$ 、あるいはその逆の $-90^{\circ} \sim +180^{\circ}$ までの回転ができる構造になっている。その際に 90° や 180° 毎にクリック感が発生し、かつ全体で 270° 以上に蓋等2を過回転をしない。

【0016】なお、この発明では主として開閉軸からなる開閉部4は、従来通りの方法や構造をそのまま利用して良いので、その方法や作用については特段の説明をしない。

【0017】この発明になるヒンジ装置の回転部3について図2の概略分解図にしたがって説明をする。開閉軸7に半月状に成形してなる平面部8を設ける。平面部8の中央部位に軸孔9を穿つ。平面部8の裏側に軸孔9周囲に浅い底面10も設けておく。回転軸11の先端部分は段差面12を付けて細くしてあり、先端の細い軸部13の適切な位置で、小ピン14を圧入装置してある。本国では既に小ピン14を回転軸11に打ち込み装着した状態で示してあるが、該ピンは軸孔9に挿入して後に装着固定するものである。軸端15は図示の如く小判状に成形をしてカシメ固着や溶接固着に便なるようにしておく。

【0018】回転ストッパー板16はやや厚めの板で短冊状に成形され、中央に小ピン14の回転半径より大きい内径の打抜き孔17を有し、該打抜き孔17の一部に回転規制爪18を出して設けてある。かつその長手方向の両側に切欠き19を成形する。そうしてこの回転ストッパー板16は開閉軸7の平面部8に嵌合圧入されて固定される。

【0019】回転クリックばね20も図示の如く短冊状をした弾性板で構成され、その中央に軸部13が貫通可能な打抜き孔21を有し、長手方向の適切な位置に小凸

起22を1個もしくは2個以上設け、さらに長手方向の両端に図示形状の係止爪23を設けておく。係止爪23は回転ストッパー板16の切欠き19に嵌合可能である。回転クリック板24も若干厚めの板で構成される。

【0020】該回転クリック板24の中央に小判孔25を穿ち、その外周対称位置に切欠き26を成形しておく。切欠き26は回転クリックばね20の小凸起22と対応していなければならない。

【0021】次にこれらの部品を用いて回転部4を組立てるには、回転軸11を軸孔9に貫通させて後、小ピン14を先ず回転軸11に予め穿ってある孔に圧入装置し、その後で回転ストッパー板16を開閉軸7の平面部に嵌合装置させ、回転クリックばねを回転軸に挿入して回転ストッパー板16の切欠き19に嵌合させ、最後に回転クリック板24を回転軸11の軸端15に圧入して回転軸11とカシメ及び溶接固着する。

【0022】組立後の状態を図3に示す。回転軸11自体は、その段差面12と先端の回転クリック板24とで開閉軸7を把持した状態を保持し、回転クリックばね20の発生する弾性反力によって開閉軸を強固に挟んで押圧し合い、かつすべり止め条件で挿入される軸孔9によって回転自在に軸持されている。小ピン14は回転ストッパー板16の板内に位置しており、小ピン14が打抜き孔17内でその角度を変える。

【0023】図3の矢視X-Xで回転クリックばね20を削除して見た状態を正面図にして図4に示す。小ピン14が図の如く右下にある状態は、蓋等2を開いた直後の位置である。回転クリックばね20の係止爪23が回転ストッパー板22の切欠き19に進入し、該回転クリックばね20の随意の回転を拘束する。

【0024】次に、図5～図7にしたがってその作用を説明する。図5は図1に示す蓋等2を閉じている状態あるいは矢印5の方向に蓋等2を開いた直後の状態を示す。小ピン14は図示右下方向に出ている。

【0025】図6は蓋等2を回転させた後の状態を示す。蓋等2に固定されている回転軸の軸端15も矢印27方向に回転をし、すなわち、この反時計回りの方向を正(+)とすれば $+90^{\circ}$ に回転をし、そこで小ピン14が回転ストッパー板16に設けてある係止爪18に当接してそれ以上の過回転を規制する。

【0026】図7は、蓋等2を逆の矢印28方向に回転させた後の状態を示す。小ピン14は時計回りに -180° 回転をし、係止爪18の反対側の左側に当接して停止させられる。したがって、軸端15に設けられた小ピン14は、正逆合わせて 270° の範囲で自在に回転が可能である。 $+180^{\circ} \sim -90^{\circ}$ での回転可能範囲にするには、例えばこの小ピン14を図面の左上方に向けて出すかあるいは係止爪18を最下方位置に設けるか、で良い。この条件は製品コンセプトにしたがって決定される。

【0027】次にクリック感の発生作用について説明をする。図2に示すように、回転軸11の軸端15にカシメ固定された回転クリック板24が $+90^\circ$ あるいは -180° に回転させられる度に、回転クリックばね20上に設けられた小凸起22と回転クリック板の切欠き26が合致すると、回転クリックばね20の反力を受けてお互いに嵌合し合う。

【0028】したがって、嵌合し合った状態から抜け出すためには、切欠き26の縁が小凸起22に乗り上げる、すなわち回転軸11を回し出す瞬間に回転に多少の回転抵抗力を発生させる。その逆に切欠き26が小凸起22の至近位置に至ると、急に回転が軽くなって定位置に正確に停止する。かくして表示部蓋等2を回転させると、定位置で図示では $+90^\circ$ と -180° の位置でクリック感が発生させる。

【0029】図2では切欠き26が対向して2箇所に設けてあるが、これを適切な位置に 90° 等配で4箇所設けると、当然のことながら 90° 毎にクリック感が発生する。

【0030】さらに請求項2の発明になるヒンジ装置について、図8の分解斜視図にしたがって説明をする。開閉軸31に半月状に成形してなる平面部32を設け、その平面部の終端2箇所に係止溝33を設けておく。平面部32の中央部位に軸孔34を穿ち、その裏側には軸孔34の周囲に浅い底面35も設けておく。

【0031】回転軸36の先端部分は段差面37を付けて細くして軸部38を設け、その軸部38の適切な位置に小ピン39を圧入装着する。

【0032】本図でも組立前に小ピン39を軸部38に打込み装着済みの状態で示してあるが、該ピンは軸孔34に挿入して後に装着固定するものであることは前述のとおりである。軸端40は図示のように小判状に成形してカシメ固着や溶接固着に便するようにしておく。

【0033】回転クリックばね41も図示のように短冊状をした弾性板で構成されるが、その中央に軸部13が貫通可能な打抜き孔42を有し、その打抜き孔42の内側に係止爪43を平面部32側（図面向こう側）に折り曲げて成形をする。

【0034】又、長手方向の適切な位置には小凸部44を1個もしくは2個以上設けておき、さらに長手方向の両端に図示形状の嵌合爪45を設ける。

【0035】回転クリック板46は若干厚めの板で構成する。該回転クリック板46の中央に小判孔47を穿ち、その外周対称位置に切欠き48を成形しておく形状は前述の実施例と同じである。この切欠き48は回転クリックばね41の小凸部44と対応していなければならない。

【0036】次にこれらの部品を用いて組立てるには、回転軸36を軸孔34に貫通させて後、小ピン39を先ず回転軸36に予め穿ってある孔に圧入装着し、その後

回転クリックばね41を回転軸36に挿入して、嵌合爪45を開閉軸の係止溝33に嵌合させ、最後に回転クリック板46を回転軸の軸端40に圧入して回転軸とカシメ及び溶接固着をする。

【0037】図9にこの実施例の組立断面の状態を側面図で示す。回転軸36自体は、その段差面37と先端の回転クリック板46とで開閉軸31を把持した状態を保持し、回転クリックばね41の発生する弾性反力によってこれを強固に挟んで押押し合い、かつ、すべり止め条件で挿入される軸孔34によって回転自在に軸持されている。小ピン39は回転クリックばね41と平面部32との間隙内に位置しており、小ピン39はその間隙内に円滑に回転角度を変える。

【0038】図9の矢視Y-Yで、回転クリックばね41を表からみた状態を正面図にして図10に示す。小ピン39が図の如く右下にある状態は蓋等2を開いた直後の位置である。回転クリックばね41の嵌合爪45が開閉軸の係止溝33に嵌合し、該回転クリックばね41の任意の移動と回転とを拘束する。

【0039】次に図11～図13にしたがってその作用を説明する。ただし、その作用は先の実施例に似ているので、重複を避けて簡単に説明をする。

【0040】図11は図1に示す蓋等2を閉じている状態あるいは矢印5の方向に蓋等2を開いた直後の状態を示し、先の実施例での図5に相当する状態である。小ピン39は当然のことながら図の右下方向に向いている。

【0041】図12は蓋等2を正（+）方向の反時計回りに 90° 回転させた後の状態を示す。蓋等2に一体の小ピン39も矢印49方向に回転をし、回転クリックばね41に設けた係止爪43に当接し、それ以上の過回転を規制する。

【0042】図13は逆に矢印50方向に回転させた後の状態を示す。小ピン14は時計回りに -180° 回転し、係止爪43に当接してから停止する。したがって、蓋等2は都合 270° の範囲で自在に回転が可能になる。クリック感の発生作用については前実施例と同じなので、ここでは説明を割愛する。

【0043】図8では、切欠き48が対向して2箇所に設けてあるが、当然のことながら 90° 等配で 90° 毎にクリック感が発生させることも可能である。

【0044】

【発明の効果】以上詳述した如く、請求項1の発明によれば各部品の形状が単純化され、又、部品の点数が削減され、それによる加工及び組立の作業性がより平易化単純化され、全体に小型化することができる。請求項2の発明は、さらに部品点数を削減できる。

【図面の簡単な説明】

【図1】この発明のヒンジ装置を設ける対象の全体の斜視図である。

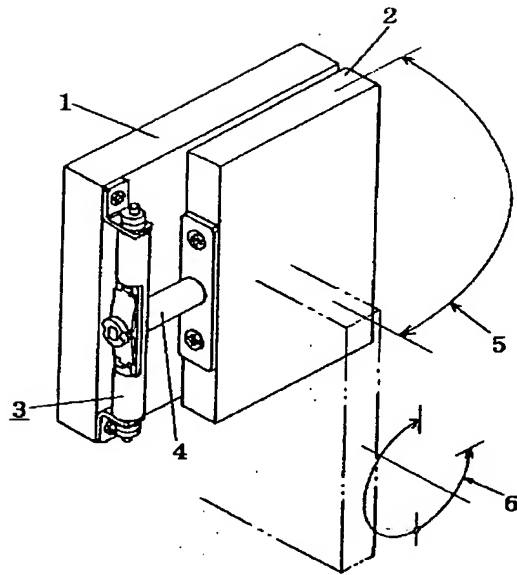
【図2】実施例の分割斜視図である。

〔図3〕回転部4の組立断面を側面図で示す。
 〔図4〕図3の矢視X-Xを正面図で示す。
 〔図5〕開閉直後の状態を正面図で示す。
 〔図6〕+90°回転後の状態を正面図で示す。
 〔図7〕-180°回転後の状態を正面図で示す。
 〔図8〕別の実施例を分解して斜視図で示す。
 〔図9〕図8の組立断面を側面図で示す。
 〔図10〕図9の矢視Y-Yを正面図で示す。
 〔図11〕開閉直後の状態を正面図で示す。
 〔図12〕+90°回転後の状態を正面図で示す。
 〔図13〕-180°回転後の状態を正面図で示す。
 〔図14〕従来のヒンジ装置の分解斜視図である。
 〔符号の説明〕

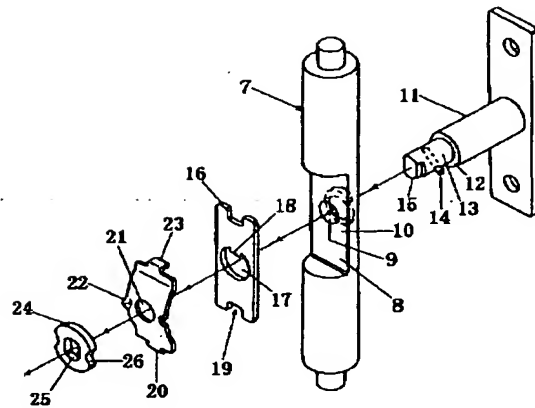
- 1 本体
- 2 蓋等
- 3 開閉部
- 4 回転部
- 5 矢印
- 6 矢印
- 7 開閉軸
- 8 平面部
- 9 軸孔
- 10 座面
- 11 回転軸
- 12 段差面
- 13 軸部
- 14 小ピン
- 15 軸端
- 16 回転ストッパー板
- 17 打抜き孔
- 18 回転規制爪
- 19 切欠き
- 20 回転クリックばね
- 21 打抜き孔
- 22 小凸起
- 23 係止爪
- 24 回転クリック板
- 25 小判孔
- 26 切欠き
- 27 矢印

- 28 矢印
- 31 開閉軸
- 32 平面部
- 33 係止溝
- 34 軸孔
- 35 座面
- 36 回転軸
- 37 段差
- 38 軸部
- 10 39 小ピン
- 40 軸端
- 41 回転クリックばね
- 42 打抜き孔
- 43 係止爪
- 44 小凸部
- 45 嵌合爪
- 46 回転クリック板
- 47 小判孔
- 48 切欠き
- 20 49 矢印
- 50 矢印
- 51 開閉軸
- 52 軸承筒
- 53 平面部
- 54 孔
- 55 回転軸
- 56 係止部
- 57 圧入代
- 58 回転ストッパー板
- 30 59 回転クリックばね
- 60 回転クリック板
- 61 係止爪
- 62 切込み
- 63 表示部蓋等
- 64 矢印
- 65 矢印
- 66 規制爪
- 67 規制ストッパー
- 68 小突起部
- 40 69 小孔

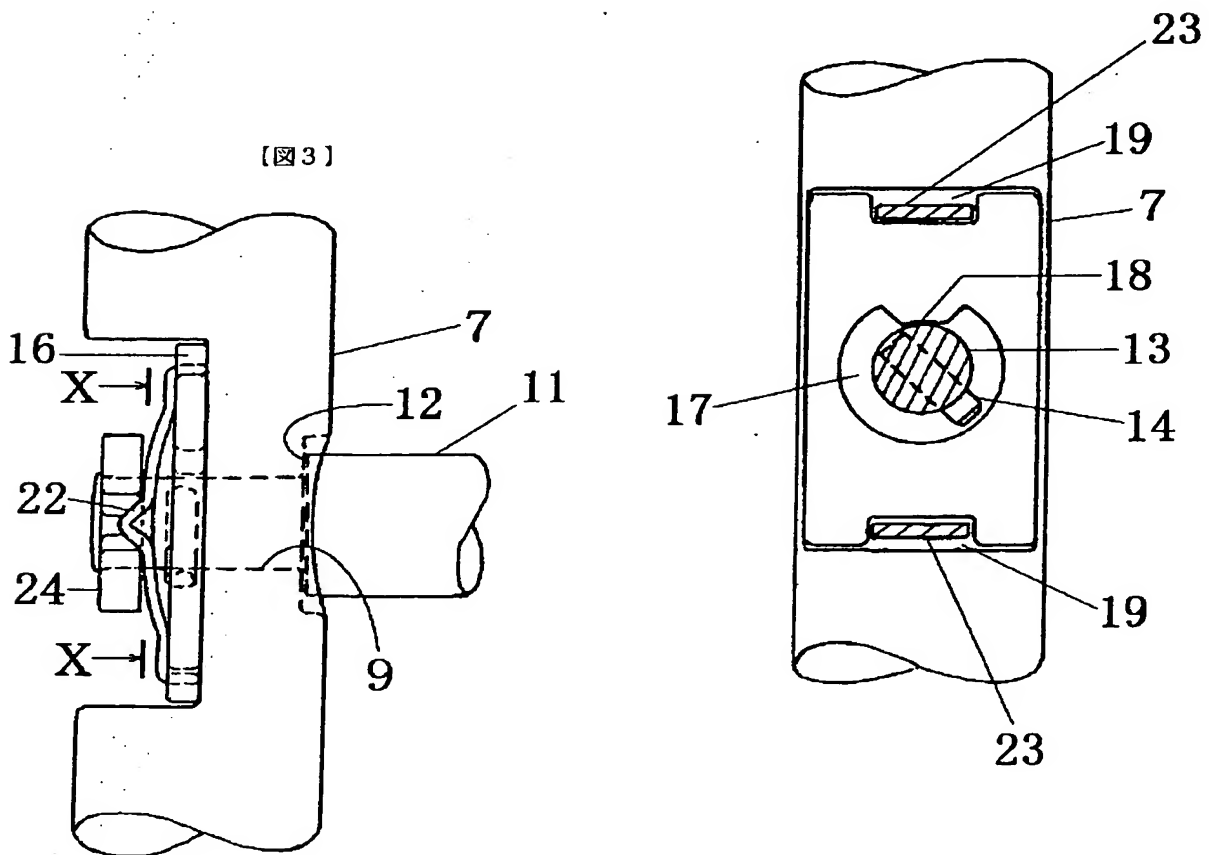
【図1】



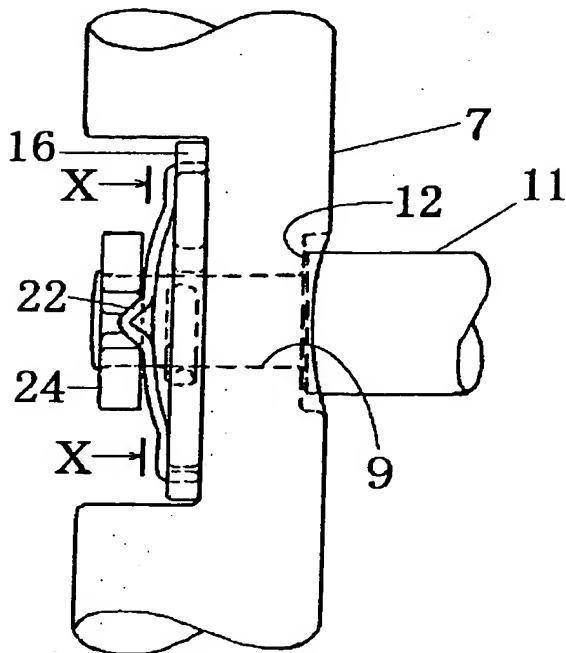
【図2】



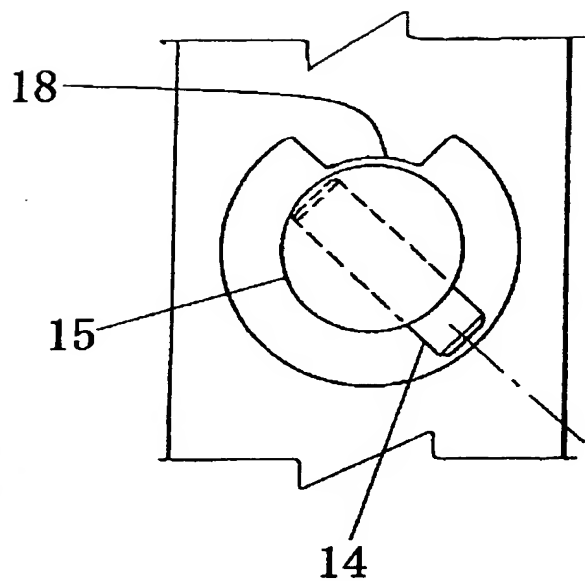
【図4】



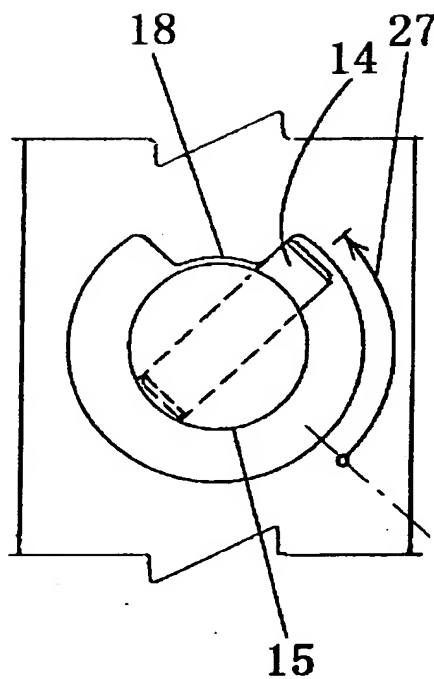
【図3】



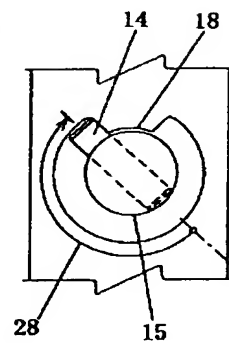
【図5】



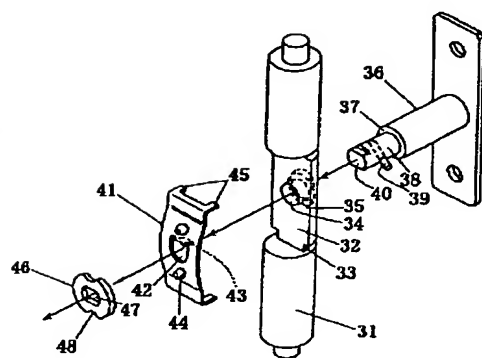
【図6】



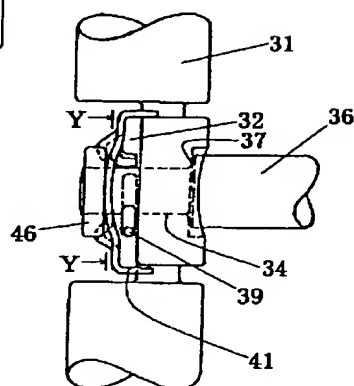
【図7】



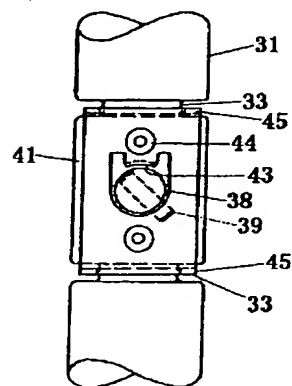
【図8】



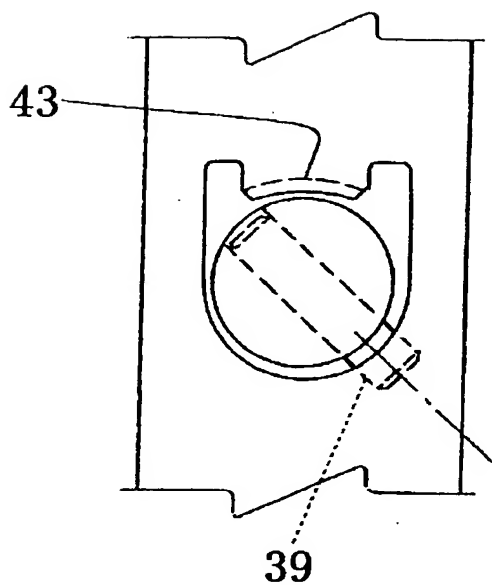
【図9】



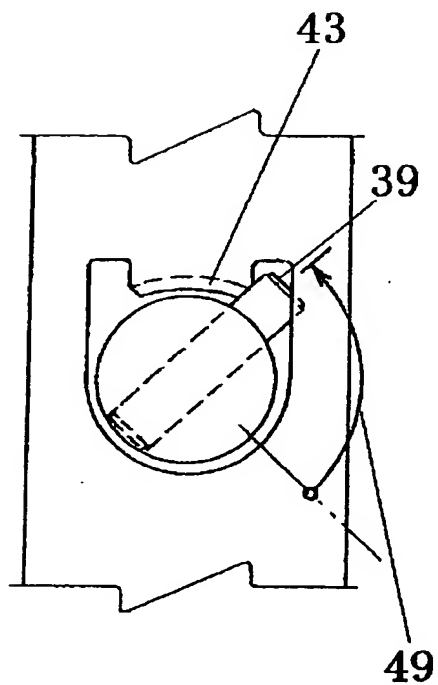
【図10】



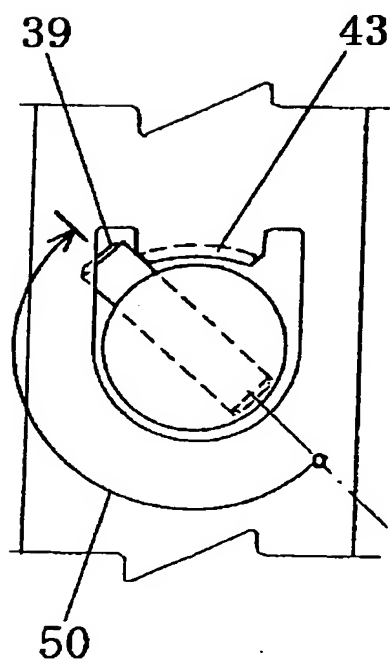
【図11】



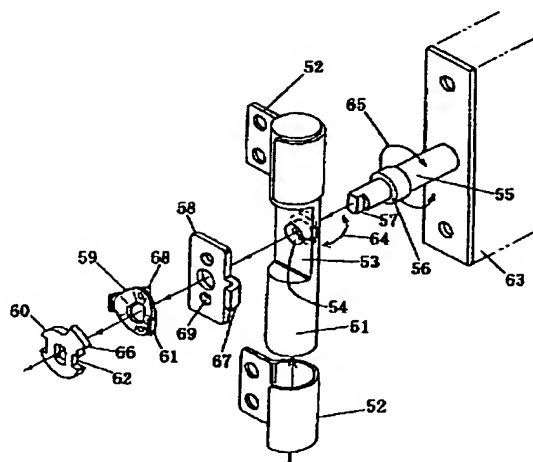
【図12】



【図13】



【図14】



フロントページの続き

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